



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/583,359	06/19/2006	Philippe Salmon	4590-529	8190
33308 7590 06/03/2011 LOWE HAUPTMAN HAM & BERNER, LLP 1700 DIAGONAL ROAD, SUITE 300 ALEXANDRIA, VA 22314				
EXAMINER				
PECHIE, JORGE O				
ART UNIT		PAPER NUMBER		
3664				
MAIL DATE		DELIVERY MODE		
06/03/2011		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/583,359

**Applicant(s)**

SALMON ET AL.

**Examiner**

JORGE PECHE

**Art Unit**

3664

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 November 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 17-22 and 24-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 17-22 and 24-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-940)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

Receipt is acknowledged of Applicants' request for continued examination and argument/remarks filed on November 10, 2010 and October 12, 2010, claims 17-22 and 24-37 are pending and an action on the merits is as follows.

Applicants' arguments with respect to claims 17-22 and 24-37 have been fully considered but are moot in view of a new ground(s) of rejection. Applicant has amended claims 17-18, 21, 26, 27, 35 and 36 and cancelled claims 1-16 and 23.

The rejection of claims 17, 18, 35, and 36 under 35 U.S.C. 112, second paragraph, has been withdrawn

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 17 recites the limitations "the first flight duration" and "the second flight duration" in page 3, line 5 and line 19. There is insufficient antecedent basis for this

limitation in the claim. Claim 17 does not provide explicit antecedent basis for the above terms.

Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 18 recites the limitations "the third flight duration" in page 5, line 1. There is insufficient antecedent basis for this limitation in the claim. Claims 18 or 17 does not provide explicit antecedent basis for the above terms.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 17-20, 21, 22, 24, 25-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meunier (Patent No.: US 6,480,120) in view of Applicant's background of the invention and further in view of Lepere et al. (Patent No.: 6,088,654).

Regarding claims 17, 25-27, 28-32, and 35, Meunier discloses an airborne terrain collision prevention device and process with prediction of turns comprising:

- memory including topographic data of the terrain and/or of the obstacles overflown (*memory (70) and memory (71) and terrain database (3)*); and information processing apparatus (*anti-collision calculations (4) / control unit (90)*) comprising (see col. 4, lines 16-55; col. 5, lines 4-10; col. 1, lines 16-19; Figures 1-2 and 4A-7):
- an input configured to receive flight parameters (*filling system and updating, GPS, INU and radio-altimeter signals*) (see col. 3, line 18 – col. 4, line 15; col. 1, lines 21-24; Figures 1-4B);
- first trajectory prediction unit configured (*consolidated flight parameters (2)*) to establish, on the basis of said flight parameters (*GPS, INU and radio-altimeter signals*), at least a first safety surface corresponding to a first predicted trajectory (*consolidated flight parameters (2) output signal, e.g. LGZ and HRS signals*) (see Figures 1-4B);
- a first topographic calculation unit (*terrain file / terrain database (3)*) to establish, on the basis of said flight surface parameters (*consolidated flight parameters (2) output signal, e.g. LGZ and HRS signals*), at least a first topographic surface constituted on the basis of the topographic data of the terrain and/or of the obstacles overflown (*terrain file / terrain database (3) output signal*) (see col. 4, lines 16-65; Figures 1-2, 4A and 7);
- a first comparison unit (*TPM1 (411) / VCM1 (421)*) configured to compare said first safety surface (*consolidated flight parameters (2) output signal, e.g. LGZ and HRS signals*) and the first topographic surface (*terrain file / terrain*

*database (3) output signal*) for determining at least one first risk of collision of the aircraft with the ground (*vertical plane VCM1 output signal*) corresponding to the first flight duration; wherein at least one of the first comparison unit or second comparison unit comprise a criticality indicator of the risk of collision with the terrain (see col. 4, lines 16-65; col. 9, lines 39 – 67; Figures 1-2, 4A, 7, 8A-8B);

- second trajectory prediction unit (*consolidated flight parameters (2)*) configured to establish, on the basis of the flight parameters (*GPS, INU and radio-altimeter signals*), a second safety surface corresponding to a second predicted trajectory (*consolidated flight parameters (2) output signal, e.g. LGZ and HRS signals; second output to TPM2/HCM2*) (see col. 3, line 18 – col. 4, line 15; col. 9, lines 39 – 67; Figures 1-4B and 7);

- second calculation unit configured (terrain file / terrain database (3)) to establish on the basis of the flight parameters (*consolidated flight parameters (2) output signal, e.g. LGZ and HRS signals*), a second topographic surface constituted on the basis of the topographic data of the terrain and/or of the obstacles overflown (*terrain file / terrain database (3) output signal; second output to TPM2/HCM2*) (see col. 4, lines 16-65; col. 9, lines 39 – 67; Figures 1-2, 4A and 7);

- second comparison unit configured (TPM2 (412) / HCM2 (422)) to compare said second safety surface (*consolidated flight parameters (2) output signal, e.g. LGZ and HRS signals; second output to TPM2/HCM2*) and the second topographic surface (*terrain file / terrain database (3) output signal*;

*second output to TPM2/HCM2*) for determining a second risk of collision of the aircraft with the ground ( *HCM2 output signal*) corresponding to the second flight duration; wherein at least one of the first comparison unit or second comparison unit comprise a criticality indicator of the risk of collision with the terrain (see col. 4, lines 16-65; col. 9, lines 39 – 67; Figures 1-2, 4A, 7, 8A-8B).

However, Meunier's invention is silent regarding an information processing apparatus comprising (1) the first safety surface having a first flight duration and being bounded laterally by a first left limit and a first right limit, said first right and left limits being defined essentially by a first lateral margin and at least a first angle of left lateral aperture and at least a first angle of right lateral aperture and (2) the second safety surface having a second flight duration lesser than the first flight duration and being bounded laterally by a second left limit and a second right limit, said second right and left limits being defined essentially by a second lateral margin and at least a second angle of left lateral aperture and at least a second angle of right lateral aperture.

However, Applicant's background of the invention teach a first part corresponding to a first flight time (T1), dependent on a prediction of the trajectory in progress calculated on the basis of an origin (O) taken under the aircraft; a second part corresponding to a second flight time (T2) following the first flight time, dependent on a prediction of a vertical avoidance trajectory; wherein the first and the second safety

surface are bounded laterally by a left limit (TG) and a right limit (TD), said limits being defined essentially by a lateral margin (ML) and at least one angle of left lateral aperture ( $\theta G$ ) and at least one angle of right lateral aperture ( $\theta D$ ); herein the lateral margins or the angles of right and left lateral aperture of the limit of the immediate safety surface or profile are substantially different from the lateral margins or from the angles of right and left lateral aperture of the limits of the other predicted surfaces (see page 4, line 1 - page 6, line 30; Figure 1).

Given the teaching of Applicant's background of the invention, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Meunier's reference to incorporate a left/right limit and a right/left aperture within the airborne terrain collision prevention device of Meunier's invention to determine an aircraft trajectory.

Doing so would enhance airborne terrain collision prevention device capable not only to aid air navigation and air safety, but also to determine an aircraft trajectory.

- alarm unit (alarm decision unit (5) ) linked to said information processing apparatus (*anti-collision calculations (4) / control unit (90)*) and configured to generate a first alarm (caution terrain, caution terrain ahead, avoid terrain and/or pull up) and a second alarm state (*caution terrain, caution terrain ahead, avoid terrain and/or pull up*); wherein the alarms are of audible or visual type (see col. 4, lines 16-65; col. 6, line 41 – col. 7, line 46; col. 9, lines 39 – 67; Figures 1-2, 4A, 7 and 10; table 1 and related text).



However, Meunier's invention, as modified by Applicant's background of the invention, fails to disclose a first alarm being a vertical avoidance alarm when the first risk of collision is avoidable by a simple vertical avoidance maneuver and a second alarm being a traverse avoidance alarm when the second risk of collision is not avoidable by a simple vertical avoidance maneuver.

However, Lepere et al. teach a terrain anti-collision process and device for aircraft, with improved display comprising a first alarm being a vertical avoidance alarm when the first risk of collision is avoidable by a simple vertical avoidance maneuver (*a pull up alarm signal*) and a second alarm (*avoid terrain alarm*) being a traverse avoidance alarm when the second risk of collision is not avoidable by a simple vertical avoidance maneuver (see col. 9, line 66 - col. 10, line 4; col. 11, lines 40-65; col. 16, line 62 – col. 17, line 6; Figures 1-11).

Given the teaching of Lepere et al., it would have been obvious to one of ordinary skill in the art at the time of the invention was made to further modify Meunier's invention to incorporate, within the alarm device unit, a pull up alarm signal when a predicted trajectory suggest a define risk in relation to the neighboring terrain overflown, and an avoid terrain alarm signal when an avoidance process of an obstacle requires not only a vertical avoidance maneuver.

Doing so would enhance an airborne terrain collision prevention device with prediction of turn capable to inform a pilot a level of hazard warning within an aircraft's trajectory.

Regarding claims 18 and 36, Meunier discloses an airborne terrain collision prevention device and process with prediction of turns, wherein said information processing means further comprises:

- third trajectory prediction unit (*consolidated flight parameters (2)*) configured to establish, at least on the basis of the flight parameters (*GPS, INU and radio-altimeter signals*), a third safety surface corresponding to a third predicted trajectory (*consolidated flight parameters (2) output signal, e.g. LGZ and HRS signals; third output to TPM3/HCM3*) (see col. 3, line 18 – col. 4, line 15; col. 9, lines 39 – 67; Figures 1-4B and 7);

However, Meunier's invention is silent regarding an information processing apparatus comprising the third safety surface having a third flight duration greater than the first flight duration and being bounded laterally by a third left limit and a third right limit, said third right and left limits being defined essentially by a third lateral margin and at least a third angle of left lateral aperture and at least a third angle of right lateral aperture;

However, Applicant's background of the invention teach a first part corresponding to a first flight time (T1), dependent on a prediction of the trajectory in

progress calculated on the basis of an origin (O) taken under the aircraft; a second part corresponding to a second flight time (T2) following the first flight time, dependent on a prediction of a vertical avoidance trajectory – these flight time periods can be used in multiple sectors across the aircraft trajectory; wherein the third safety surface are bounded laterally by a left limit (TG) and a right limit (TD), said limits being defined essentially by a lateral margin (ML) and at least one angle of left lateral aperture ( $\theta G$ ) and at least one angle of right lateral aperture ( $\theta D$ ); herein the lateral margins or the angles of right and left lateral aperture of the limit of the immediate safety surface are substantially different from the lateral margins or from the angles of right and left lateral aperture of the limits of the other predicted surfaces (see page 4, line 1 - page 6, line 30; Figure 1).

Given the teaching of Applicants' background of the invention, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Meunier's reference to incorporate a left/right limit and a right/left aperture within the airborne terrain collision prevention device of Meunier's invention to determine an aircraft trajectory.

Doing so would enhance airborne terrain collision prevention device capable not only to aid air navigation and air safety, but also to determine an aircraft trajectory.

- third topographic calculation unit ( terrain file / terrain database (3))  
configured to establish, at least on the basis of said flight parameters  
(*consolidated flight parameters (2) output signal, e.g. LGZ and HRS*)

- signals*), a third topographic surface constituted on the basis of the topographic data of the terrain and/or of the obstacles overflown ( *terrain file / terrain database (3) output signal; third output to TPM3/HCM3*) (see col. 4, lines 16-65; col. 9, lines 39 – 67; Figures 1-2, 4A and 7);
- third comparison unit configured ( *TPM3 (413) / HCM3 (423)*) to compare said third safety surface ( *consolidated flight parameters (2) output signal, e.g. LGZ and HRS signals; third output to TPM3/HCM3*) and the third topographic surface ( *terrain file / terrain database (3) output signal; third output to TPM3/HCM3*) for determining at least one third risk of collision of the aircraft with the ground according to the thirds flight duration ( *HCM2 output signal*) (see col. 4, lines 16-65; col. 9, lines 39 – 67; Figures 1-2, 4A and 7);
  - wherein the alarm unit ( *alarm decision unit (5)* ) linked to said processing apparatus ( *anti-collision calculations (4) / control unit (90)*) is further configured to establish at least a prealarm for indicating a potential collision ( *caution terrain, caution terrain ahead, avoid terrain and/or pull up*) according to the determined third risk of collision (see col. 4, lines 16-65; col. 6, line 41 – col. 7, line 46; col. 9, lines 39 – 67; Figures 1-2, 4A, 7 and 10; table 1 and related text).

Regarding claim 19, Meunier discloses an airborne terrain collision prevention device with prediction of turns, wherein the second flight time ( *VT5/VRP*) has duration

of less than 3 seconds; VRP can be a trajectory point at few seconds after VT5 (see col. 6, lines 34 – 67; Figures 8B -10).

Regarding claim 20, Meunier discloses an airborne terrain collision prevention device with prediction of turns wherein the first alarm is of the vertical avoidance alarm type (*pull up alarm / standard vertical recovery maneuver*) and the second alarm is of the transverse avoidance alarm type (*avoid terrain alarm/ standard horizontal avoidance maneuver*), the vertical avoidance alarm corresponding for the pilot to a vertical avoidance maneuver and the transverse avoidance alarm corresponding for the pilot to a transverse avoidance maneuver (see col. 6, line 41 – col. 7, line 46; table 1, Figures 8A - 10).

Regarding claims 21-22 and 24, Meunier's invention is silent regarding the claim limitations

However, Applicant's background of the invention teach wherein the first, the second or the third safety surface comprise two parts: a first part corresponding to a first flight time (T1), dependent on a prediction of the trajectory in progress calculated on the basis of an origin (O) taken under the aircraft; a second part corresponding to a second flight time (T2) following the first flight time, dependent on a prediction of a vertical avoidance trajectory; wherein the parameters defining the first part of the trajectory or the second part of the trajectory of the immediate safety surface can be substantially different from the parameters defining the other safety surfaces and wherein the first,

the second or the third safety surface are bounded laterally by a left limit ( $T_G$ ) and a right limit ( $T_D$ ), said limits being defined essentially by a lateral margin (ML) and at least one angle of left lateral aperture ( $\theta_G$ ) and at least one angle of right lateral aperture ( $\theta_D$ ); herein the lateral margins or the angles of right and left lateral aperture of the limit of the immediate safety surface or profile are substantially different from the lateral margins or from the angles of right and left lateral aperture of the limits of the other predicted surfaces (see page 4, line 1 - page 6, line 30; Figure 1).

Given the teaching of Applicant's background of the invention, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Meunier's reference to incorporate a first/second flight time, a left/right limit and a right/left aperture within the airborne terrain collision prevention device of Meunier's invention to determine an aircraft trajectory.

Doing so would enhance airborne terrain collision prevention device capable not only to aid air navigation and air safety, but also to determine an aircraft trajectory.

Regarding claims 33-34, and 37, Meunier discloses an airborne terrain collision prevention device with prediction of turn comprising a plurality of flight path duration times; for instance flight path duration  $T_1-T_0$ ,  $T_2-T_1$  and  $T_3-T_2$ . Each of these flight path durations can be adjusted or fixed at a predetermined flight duration in accordance to an airborne terrain collision and/or aircraft design (see col. 6, lines 12-65; Figures 5-9D).

***Response to Argument***

In the Applicant's arguments filed on October 12, 2010, with respect to the rejections of claims 17, 18, 35, and 36 under 35 U.S.C. 112, second paragraph, have been fully considered but are not persuasive.

Regarding Applicants' arguments with respect to the amended claims, Applicants are kindly invited to consider the above Office Action to view new ground of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jorge O. Peche whose telephone number is (571)270-1339. The examiner can normally be reached on 8:30 am - 5:30 pm Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Khoi H. Tran can be reached on 571-272-6919. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

Art Unit: 3664

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jorge O Peche/

Examiner, Art Unit 3664

/KHOI TRAN/

Supervisory Patent Examiner, Art Unit 3664